

PATENT ABSTRACTS OF JAPAN

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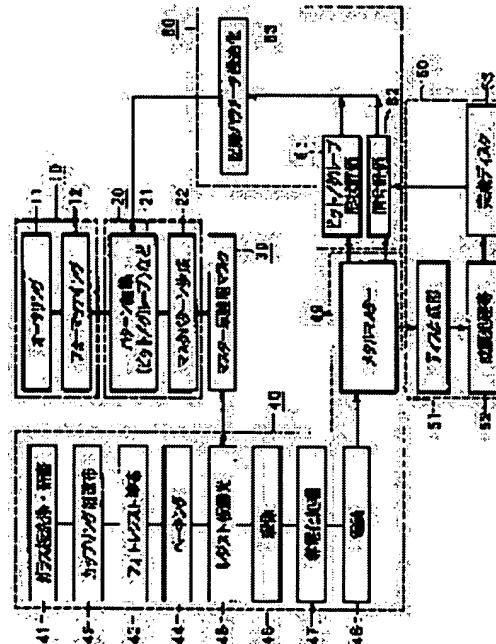
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(22) Date of filing : 02.09.1999 (72) Inventor : Hori Kazuhito

(54) MASK PATTERN PRODUCING METHOD AND DEVICE THEREFOR, AND OPTICAL DISK MANUFACTURING METHOD

(57) Abstract:

PROBLEM TO BE SOLVED: To make producible a mask pattern by shortening the recording time, enhancing the recording accuracy and reliability and, moreover, enhancing the flexibility of the correcting of a recording or the like so as to be able to deal with diversified process conditions.

SOLUTION: In a formating processing process 10, material information consisting, for example, for video and audio information by an authoring processing 11 is edited and formating of generated authoring data is performed by every fixed amount or continuously in accordance with the formats of specified media by a formating processing 12. A mask pattern generating process 20 generates basic pattern information from data of basic signal patterns needed for various optical disks by a pattern editing processing 21 and generates a mask pattern by using the basic pattern information by a mask pattern generating processing 22.



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CLAIMS

[Claim(s)]

[Claim 1] The mask pattern creation approach characterized by having formatting down stream processing which formats authoring data and generates formatting data, and the mask pattern generation process which generates a mask pattern by making the formatting data from the above-mentioned formatting down stream processing correspond with the basic pattern information acquired from the data of a basic signal pattern required for two or more sorts of optical disks.

[Claim 2] The above-mentioned basic pattern information is the mask pattern creation approach according to claim 1 characterized by being the information which computer-processed the data of a basic signal pattern required for various kinds of optical disks, and was acquired.

[Claim 3] It is the mask pattern creation approach according to claim 2 characterized by registering the above-mentioned basic pattern information into memory beforehand, and the above-mentioned mask pattern generation process generating the above-mentioned mask pattern using the registered above-mentioned basic pattern information.

[Claim 4] It is the mask pattern creation approach according to claim 1 characterized by the above-mentioned basic pattern information being two or more kinds of pit patterns when the above-mentioned optical disk is what records information by the pit.

[Claim 5] The above-mentioned basic pattern information is the mask pattern creation approach according to claim 4 characterized by being the information which parameterized the pit configuration.

[Claim 6] The mask pattern creation approach according to claim 5 characterized by amending pit size for every pit pattern of the above-mentioned two or more classes according to the above-mentioned formatting data.

[Claim 7] The mask pattern creation approach according to claim 5 characterized by amending a gap of the direction of a time-axis of the pit pattern of the above-mentioned two or more classes according to the above-mentioned formatting data.

[Claim 8] The mask pattern creation approach according to claim 5 characterized by controlling the slope of the pit edge section of the pit pattern of the above-mentioned two or more classes according to the above-mentioned formatting data.

[Claim 9] The mask-pattern listing device characterized by to have a basic pattern information generation means generate basic pattern information from the data of a basic signal pattern required for various kinds of optical disks, and a mask pattern image generation means generate a mask pattern image by making the formatting data which formatted authoring data and were obtained correspond with the basic pattern information on the above-mentioned basic pattern information generation means.

[Claim 10] It is the mask pattern listing device according to claim 9 which is equipped with a memory means by which the above-mentioned basic pattern information generated with the above-mentioned basic pattern information generation means is registered, and is characterized by the above-mentioned mask pattern image creation means generating the above-mentioned mask pattern image using the above-mentioned basic pattern information registered into the above-mentioned memory means.

[Claim 11] It is the mask pattern listing device according to claim 9 characterized by the above-

mentioned basic pattern information being two or more kinds of pit patterns when the above-mentioned optical disk is what records information by the pit.

[Claim 12] The above-mentioned basic pattern information is a mask pattern listing device according to claim 11 characterized by being the information which parameterized the pit configuration.

[Claim 13] The mask pattern listing device according to claim 12 characterized by amending pit size for every pit pattern of the above-mentioned two or more classes according to the above-mentioned formatting data.

[Claim 14] The mask pattern listing device according to claim 12 characterized by amending a gap of the direction of a time-axis of the pit pattern of the above-mentioned two or more classes according to the above-mentioned formatting data.

[Claim 15] The mask pattern listing device according to claim 12 characterized by controlling the slope of the pit edge section of the pit pattern of the above-mentioned two or more classes according to the above-mentioned formatting data.

[Claim 16] Formatting down stream processing which formats authoring data and generates formatting data, The formatting data from the above-mentioned formatting down stream processing The mask pattern generation process which generates a mask pattern by making it correspond with the basic pattern information acquired from the data of a basic signal pattern required for various kinds of optical disks, The master mask original recording creation process which creates master mask original recording from the mask pattern generated at the above-mentioned mask pattern generation process, The metal master creation process which creates a metal master using the above-mentioned master mask original recording created at the above-mentioned master mask original recording creation process, The optical disk manufacture approach characterized by coming to have the optical disk completion process which completes an optical disk using the metal master created at the above-mentioned metal master creation process.

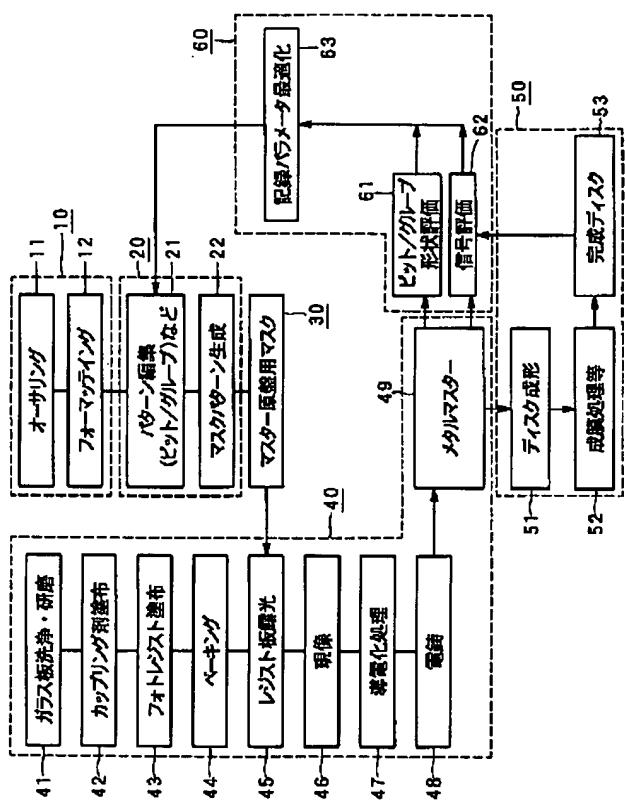
[Claim 17] The above-mentioned metal master creation process is the optical disk manufacture approach according to claim 16 characterized by creating a metal master by electrocasting which carried out projection exposure of the whole face of a board where the resist was applied, developed the exposed predetermined part using the above-mentioned master mask original recording, formed the electric conduction film, and used this electric conduction film as the electrode.

[Claim 18] The above-mentioned optical disk completion process is the optical disk manufacture approach according to claim 16 characterized by forming various film and completing an optical disk after carrying out injection molding of the resin using the above-mentioned metal master.

[Claim 19] The optical disk manufacture approach according to claim 16 characterized by controlling the precision of the mask pattern creation in the above-mentioned mask pattern generation process based on the evaluation result of the above-mentioned metal master created at the above-mentioned metal master creation process, and optimizing a record parameter.

[Claim 20] The optical disk manufacture approach according to claim 16 characterized by controlling the precision of the mask pattern creation in the above-mentioned mask pattern generation process based on the evaluation result of the above-mentioned optical disk completed at the above-mentioned optical disk completion process, and optimizing a record parameter.

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Drawing selection Representative drawing 

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the optical disk manufacture approach of manufacturing an optical disk using the above-mentioned metal master created by the mask pattern creation approach which creates the mask pattern for the mask for master original recording used at the projection exposure process for creating the metal master used as optical disk original recording and equipment, and the list based on the mask pattern created by the above-mentioned mask pattern creation approach and equipment.

[0002]

[Description of the Prior Art] First, the outline of the approach of manufacturing optical disk original recording is explained. Optical disk original recording is a metal master or La Stampa, is a mold required for shaping of an optical disk, and is a circular metal plate with a thickness [with the front face of the detailed convex configuration for / which makes a pit, for example / being formed in a disk] of about 0.3mm.

[0003] The process of the original recording manufacture approach general to below is explained using drawing 8.

[0004] First, a glass plate is washed and ground with a soaping machine (glass plate washing / polish processing 91). Next, a photoresist is applied by fixed thickness on a glass plate by resist coater after applying the coupling agent which raises the adhesion to the glass plate of a resist (coupling agent spreading processing 92) (photoresist spreading processing 93). And this resist board is baked with constant temperature (baking processing 94).

[0005] The resist board 110 by which baking was carried out is set on the precision rotary table 111 of the cutting machine shown in drawing 9 for the laser cutting processing 95. The precision rotary table 111 rotates by the motor 112 by which a rotation servo is applied. And from on the linear head 113 constituted so that the straight-line drive of the normal top of this precision rotary table 111 might be carried out at a precision, a laser beam is irradiated, it exposes, and a signal is recorded. It has 115, a beam splitter 116, and objective lenses 117, such as an optical modulator 114 and an optical-system lens, the optical slider 118 is slid by the radial delivery system motor 119, and the linear head 113 is driven. The signal which carried out encoding of the subcoding signal to the optical modulator 114 through the signal generator 120 by the authoring data from the authoring processing 96 and the formatting processing 97 which are shown in drawing 8 is supplied. The laser beam from the laser 122 for record which the optical modulator 114 modulated according to this encoding signal is irradiated by the resist board 110 on the precision rotary table 111 through the above-mentioned optical-system lens 115, a beam splitter 116, and an objective lens 117. According to the focal error signal which the optical detector 121 detected, the focus of an objective lens 117 is controlled, when a drive coil drives.

Moreover, a linear feeding servo is hung on the radial delivery system motor 119, and an exposure power control servo is hung on the laser 122 for record.

[0006] After the above-mentioned laser cutting processing 95 finishes, next, negatives are developed

with a developing machine (development 98), the resist of the pit section or the groove section is removed, and original recording is done. If original recording is done, the electrode of Nickel nickel will be formed in 100nm or less by the electric conduction-ized processing 99, and nickel is further plated in thickness of about 300 micrometers on it with a thin-film-processing machine (electrocasting processing 100). And the photoresist which exfoliated nickel metal plate from the glass plate, and adhered is removed, and La Stamp which prepares a bore and an outer diameter and is called a metal master 101 is done. As for a metal master 101, signal precision etc. is estimated by the signal evaluation processing 102.

[0007]

[Problem(s) to be Solved by the Invention] By the way, it is necessary to determine conditions carefully that the disk manufactured through two or more next processes will satisfy specification and, and the careful cautions for keeping the condition certain are continuously searched for during the work over long duration in these processes, especially a laser cutting process.

[0008]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is process drawing of the example of the optical disk manufacture approach of this invention.

[Drawing 2] It is drawing showing the record signal pattern of CD.

[Drawing 3] It is drawing having parameterized and shown the Pitt configuration.

[Drawing 4] It is drawing for explaining amendment record of pit size.

[Drawing 5] It is drawing for explaining amendment record in Pitt's direction of a time-axis.

[Drawing 6] It is drawing for explaining control of the slope of the pit edge section.

[Drawing 7] It is the block diagram of the example of a mask pattern listing device.

[Drawing 8] It is process drawing of the conventional original recording manufacture approach.

[Drawing 9] It is the block diagram showing the configuration of the conventional cutting machine.

[Description of Notations]

10 Formatting Down Stream Processing, 20 Mask Pattern Generation Process, 30 Master-Mask Original Recording Creation Process, 40 Metal Master Creation Process, 50 Optical Disk Completion Process

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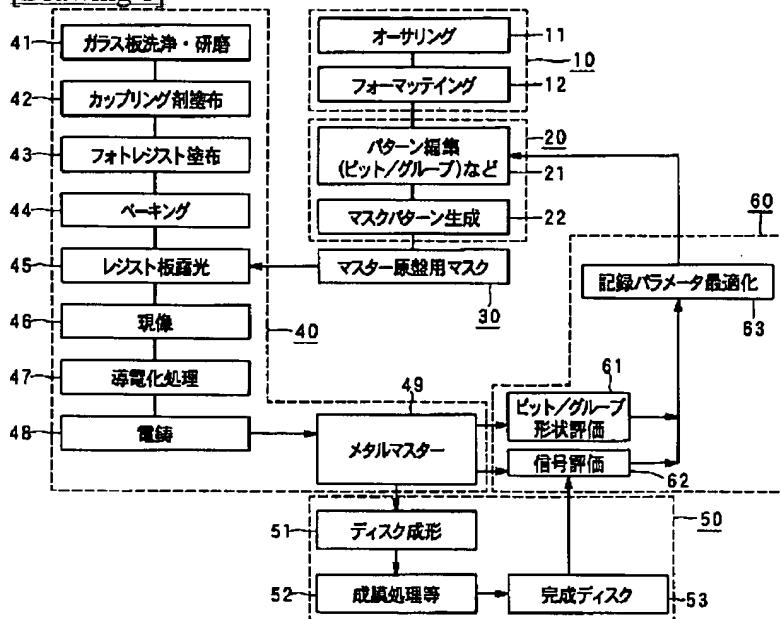
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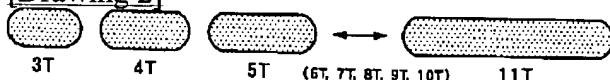
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DRAWINGS

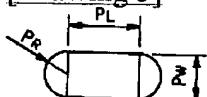
[Drawing 1]



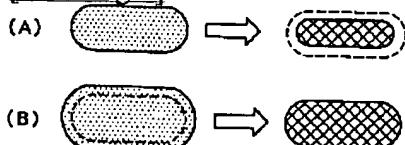
[Drawing 2]



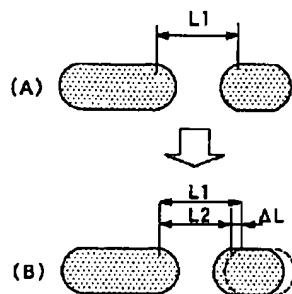
[Drawing 3]



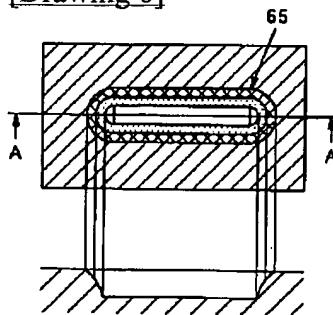
[Drawing 4]



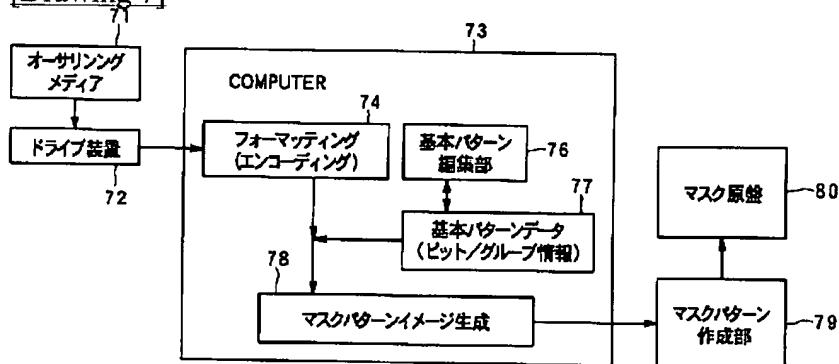
[Drawing 5]



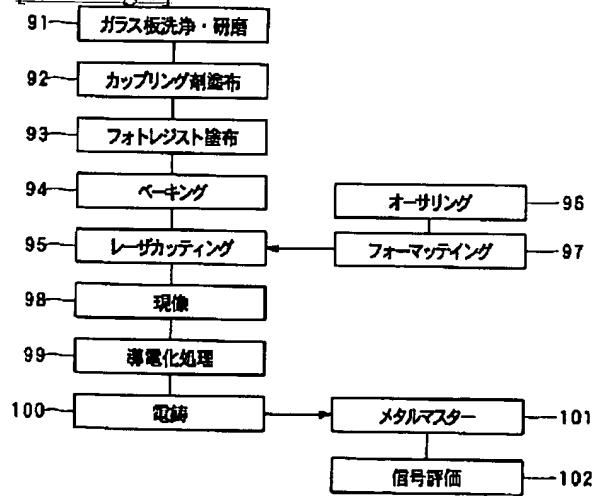
[Drawing 6]



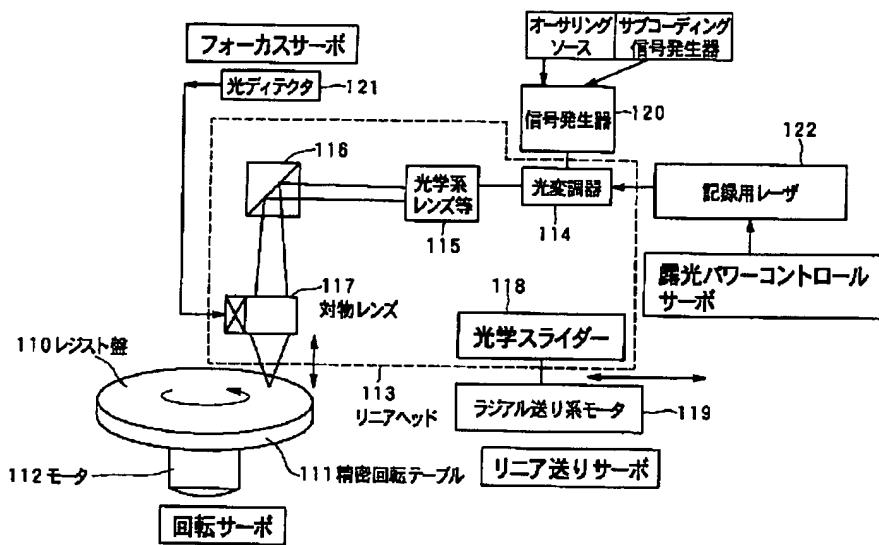
[Drawing 7]



[Drawing 8]



[Drawing 9]



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